



# Medication Adherence

*[Primary care educators may use the following slides for their own teaching purposes]*

**CDC's Noon Conference**  
**March 27, 2013**

# Overview of This Educational Module

- ❑ Medication adherence
- ❑ Burden of non-adherence
- ❑ Effective interventions to improve adherence
- ❑ Measuring medication adherence
- ❑ Provider's role in improving medication adherence
- ❑ Tools and resources
- ❑ Case studies





# DEFINITION



# What is Adherence?

- ❑ **Cluster of behaviors**
- ❑ **Simultaneously affected by multiple factors**
- ❑ **The extent to which a person's behavior—taking medication, following a diet, or making healthy lifestyle changes—corresponds with agreed-upon recommendations from a health-care provider**
  - World Health Organization, 2003



# What is Medication Adherence?

- ❑ **Medication Adherence**: The patient's conformance with the provider's recommendation with respect to *timing, dosage, and frequency* of medication-taking during the prescribed length of time
- ❑ **Compliance**: Patient's passive following of provider's orders
- ❑ **Persistence**: Duration of time patient takes medication, from initiation to discontinuation of therapy



Source:

[http://www.effectivehealthcare.ahrq.gov/ehc/products/296/1248/EvidenceReport208\\_CQGMedAdherence\\_FinalReport\\_20120905.pdf](http://www.effectivehealthcare.ahrq.gov/ehc/products/296/1248/EvidenceReport208_CQGMedAdherence_FinalReport_20120905.pdf)



# OBJECTIVES





## **Objectives of This Module**

- ❑ Learn ways to improve medication adherence rates**
- ❑ Develop a summary of existing evidence-based knowledge**
- ❑ Inform, raise awareness, and promote discussion among patients, clinicians, pharmacists, payers, public health practitioners, and decision makers about ways to improve medication adherence**



# BACKGROUND





# Background

- ❑ **Medication prescriptions never filled: 20% to 30%**
- ❑ **Medication not continued as prescribed in about 50% of cases**
- ❑ **The World Health Organization estimated that by 2020, the number of Americans affected by at least one chronic condition requiring medication therapy will grow to 157 million**

# Medication Adherence in United States

- ❑ **Rates of medication adherence drop after first six months**
- ❑ **Only 51% of Americans treated for hypertension are adherent to their long-term therapy**
- ❑ **About 25% to 50% of patients discontinue statins within one year of treatment initiation**

Source: Choudhry 2011, N Engl J Med; Yeaw 2009, J Manag Care Pharm; Script Your Future press release, November 2, 2011; accessed here: <http://scriptyourfuture.org/wp-content/themes/cons/m/release.pdf>.



# BURDEN OF NON-ADHERENCE



## **Non-Adherence—Economic**

- ❑ Direct cost estimated at \$100 billion to \$289 billion annually**
- ❑ Costs \$2000 per patient in physician visits annually**
- ❑ Improved self-management of chronic diseases results in an approximate cost-to-savings ratio of 1:10**
- ❑ Cost-related non-adherence reported by 11.4% (~543,000 individuals) of stroke survivors, mostly among the uninsured and younger (45 to 64 years)**

# Non-Adherence—Clinical Outcomes

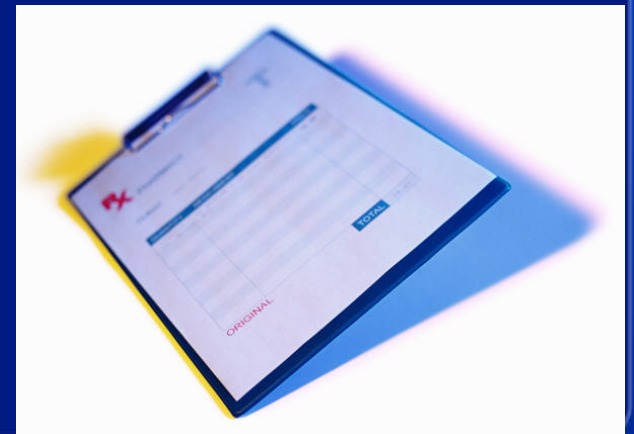
- ❑ High adherence to antihypertensive medication is associated with higher odds of blood pressure control
- ❑ Each incremental 25% increase in proportion of days covered (PDC ) for statins is associated with ~3.8 mg/dl reduction in LDL cholesterol

# **Non-adherence—Mortality, Hospitalizations, ED Visits**

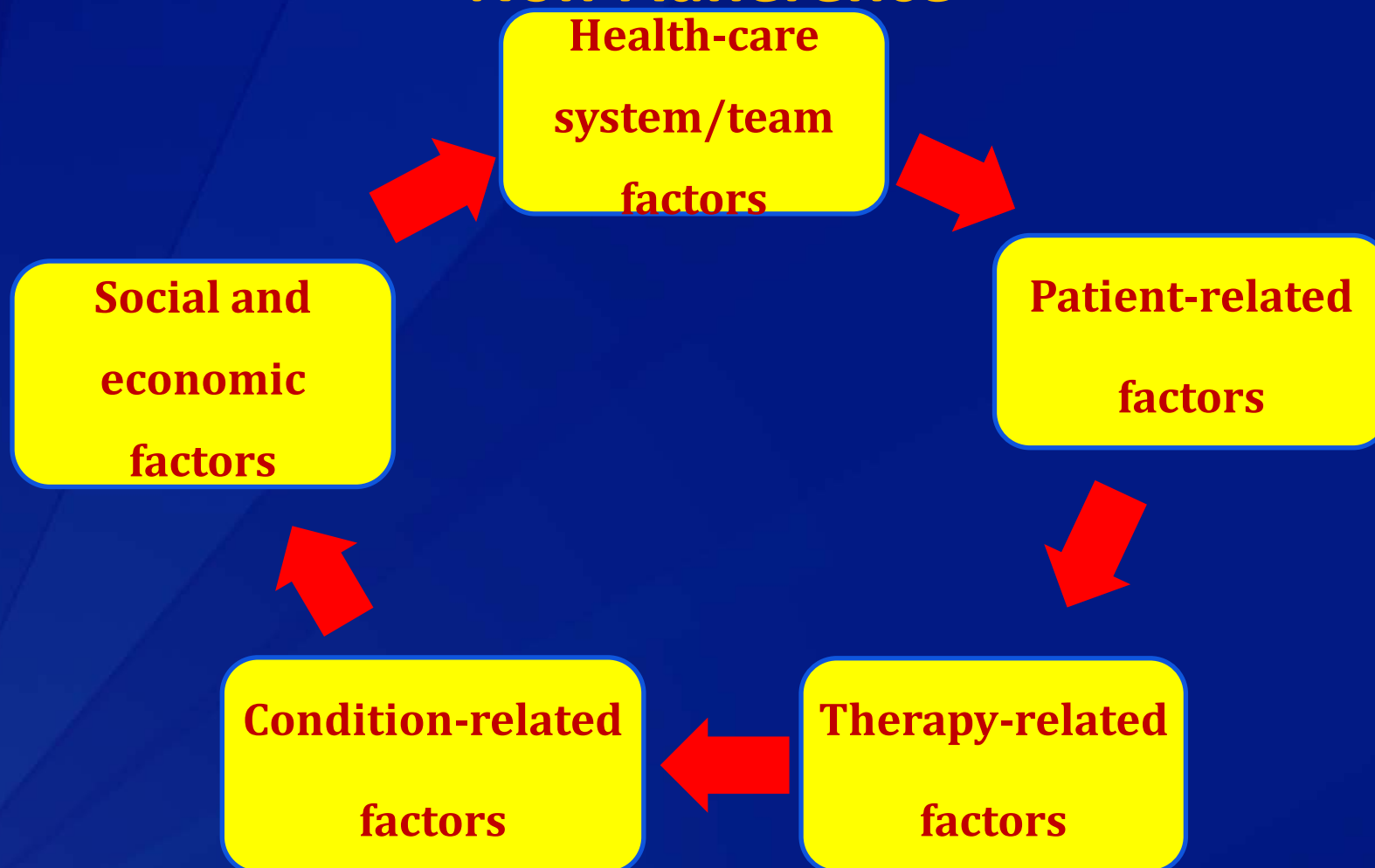
- ❑ **Non-adherence causes ~30% to 50% of treatment failures and 125,000 deaths annually**
- ❑ **Non-adherence to statins increased relative risk for mortality (~12% to 25%)**
- ❑ **Non-adherence to cardioprotective medications increased risk of cardiovascular hospitalizations (10% to 40%) and mortality (50% to 80%)**
- ❑ **Poor adherence to heart failure medications increased the number of cardiovascular-related emergency department (ED) visits**



# DIMENSIONS OF NON-ADHERENCE



# Five Interacting Dimensions of Non-Adherence





# Health-care Factors

## Health-care System

- ❑ Access to care
- ❑ Continuity of care
- ❑ Patient education material not written in plain language

## Health-care Team

- ❑ Stress of health-care visits
- ❑ Discomfort in asking providers questions
- ❑ Patient's belief or understanding
- ❑ Patient's forgetfulness or carelessness
- ❑ Stressful life events
- ❑ Lack of immediate benefit of therapy

# Provider Factors

- ❑ **Communication skills**
- ❑ **Knowledge of health literacy issues**
- ❑ **Lack of empathy**
- ❑ **Lack of positive reinforcement**
- ❑ **Number of comorbid conditions**
- ❑ **Number of medications needed per day**
- ❑ **Types or components of medication**
- ❑ **Amount of prescribed medications or duration of prescription**



# Patient, Condition, and Therapy Factors

## Patient-related

- ❑ Physical
- ❑ Psychological



## Condition- and therapy-related

- ❑ Complexity of medication
- ❑ Frequent changes in regimen
- ❑ Treatment requiring mastery of certain techniques
- ❑ Unpleasant side effects
- ❑ Duration of therapy
- ❑ Lack of immediate benefit of therapy
- ❑ Medications with social stigma

# Economic and Social Factors

## Economic

- ❑ Health insurance
- ❑ Medication cost



## Social

- ❑ Limited English proficiency
- ❑ Inability to access or difficulty accessing pharmacy
- ❑ Lack of family or social support
- ❑ Unstable living conditions



# What May Providers Do to Overcome These Challenges?

- ❑ **Communication is key!**
- ❑ **Effective interventions**
- ❑ **Measure medication adherence**

Sources: Ratanawongsa 2012 Arch Intern Med ; Bramley 2006 J Manag Care Pharm 12(3):239-245; Martin 2011 Am J Health Promot 25(6):372-378



# INTERVENTIONS



# SIMPLE

- ❑ **S**—Simplify the regimen
- ❑ **I**—Impart knowledge
- ❑ **M**—Modify patient beliefs and behavior
- ❑ **P**—Provide communication and trust
- ❑ **L**—Leave the bias
- ❑ **E**—Evaluate adherence



## **S—Simplify the Regimen**

- ❑ Adjust timing, frequency, amount, and dosage**
- ❑ Match regimen to patient's activities of daily living**
- ❑ Recommend taking all medications at the same time of day**
- ❑ Avoid prescribing medications with special requirements**
- ❑ Investigate customized packaging for patients**
- ❑ Encourage use of adherence aids**
- ❑ Consider changing the situation vs. changing the patient**

Source: <http://www.acpm.org/?MedAdherTT> ClinRef





# I—Impart Knowledge

- ❑ Focus on patient-provider shared decision making
- ❑ Keep the team informed (physicians, nurses, and pharmacists)
- ❑ Involve patient's family or caregiver if appropriate
- ❑ Advise on how to cope with medication costs
- ❑ Provide all prescription instructions clearly in writing and verbally
- ❑ Suggest additional information from Internet if patients are interested
- ❑ Reinforce all discussions often, especially for low-literacy patients

Source: [http://www.acpm.org/?MedAdherTT\\_ClinRef](http://www.acpm.org/?MedAdherTT_ClinRef)



## **M—Modify Patient Beliefs and Behavior**

- ❑ **Empower patients to self-manage their condition**
- ❑ **Ensure that patients understand their risks if they don't take their medications**
- ❑ **Ask patients about the consequences of not taking their medications**
- ❑ **Have patients restate the positive benefits of taking their medications**
- ❑ **Address fears and concerns**
- ❑ **Provide rewards for adherence**

Source: [http://www.acpm.org/?MedAdherTT\\_ClinRef](http://www.acpm.org/?MedAdherTT_ClinRef)



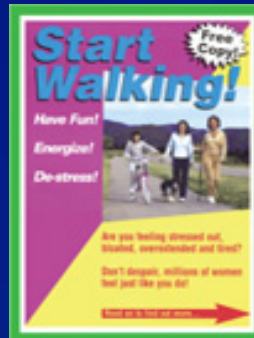
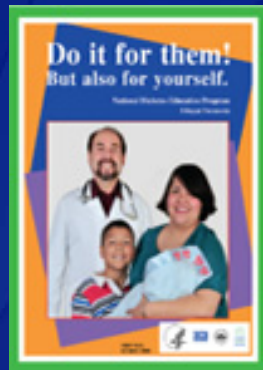
# P—Provide Communication and Trust

- ❑ Improve interviewing skills
- ❑ Practice active listening
- ❑ Provide emotional support
- ❑ Use plain language
- ❑ Elicit patient's input in treatment decisions



# L—Leave the Bias

- ❑ Understand health literacy and how it affects outcomes
- ❑ Examine self-efficacy regarding care of racial, ethnic, and social minority populations
- ❑ Develop patient-centered communication style
- ❑ Acknowledge biases in medical decision making
- ❑ Address dissonance of patient-provider, race-ethnicity, and language



Sources: [http://www.acpm.org/?MedAdherTT\\_ClinRef](http://www.acpm.org/?MedAdherTT_ClinRef); Bandura, A. (1997). Self-efficacy: The exercise of control. New York: W.H. Freeman; Bandura, A. (1994). Self-efficacy. In V.S. Ramachaudran (Ed.), Encyclopedia of human behavior;4. New York: Academic Press, pp. 71-81.

## E—Evaluating Adherence

- ❑ **Self-report**
- ❑ **Ask about adherence behavior at every visit**
- ❑ **Periodically review patient's medication containers, noting renewal dates**
- ❑ **Use biochemical tests—measure serum or urine medication levels as needed**
- ❑ **Use medication adherence scales—for example:**
  - Morisky-8 (MMAS-8)
  - Morisky-4 (MMAS-4, also known as the Medication Adherence Questionnaire or MAQ)
  - Medication Possession Ratio (MPR)
  - Proportion of Days Covered (PDC)



Sources: [http://www.acpm.org/?MedAdherTT\\_ClinRef](http://www.acpm.org/?MedAdherTT_ClinRef); Morisky, DE & DiMatteo, MR. Journal of Clinical Epidemiology 2011; 64:262-263; [https://www.urac.org/MedicationAdherence/includes/Nau\\_Presentation.pdf](https://www.urac.org/MedicationAdherence/includes/Nau_Presentation.pdf)

# MEDICATION ADHERENCE SCALES



# General Guide to Choosing Medication Adherence Scales Based on Disease of Interest

Therapeutic Area	Medication Adherence Scales
<b>Metabolic Disorders: hypertension, dyslipidemia, diabetes</b>	<b>MAQ (shortest to administer) SEAMS (assesses self-efficacy) BMQ (diabetes only) Hill-Bone Compliance Scale (hypertension in predominantly black populations)</b>
<b>Mental Health: schizophrenia, psychosis, depression</b>	<b>MARS (schizophrenia and psychosis) BMQ (depression)</b>

Abbreviations used:

BMQ = Brief Medication Questionnaire

MAQ = Medication Adherence Questionnaire (also known as the Morisky-4 or MMAS-4 scale)

MARS = Medication Adherence Rating Scale

SEAMS = Self-Efficacy for Appropriate Medication Use Scale

Source: Lavsa SM et al. J Am Pharm Assoc. 2011;51(1):90-94;



# Interventions Should be Patient-Tailored

## ❑ Behavior-related

- Forgetfulness of patients
  - Daily alerts
  - 90 days medication supplies
  - Automatic renewals

## ❑ Clinical—Questions or concerns about medication

- Pharmacist consultation
- Linguistically and culturally appropriate

## ❑ Cost-related

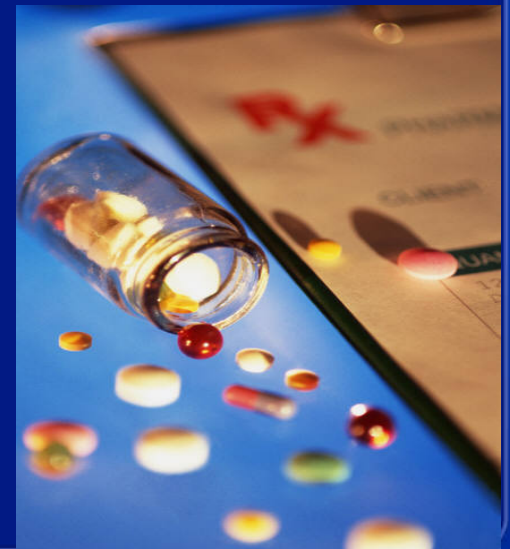
- Payment assistance programs
- Lower cost medication alternatives
- Lower cost pharmacy option (e.g. , home delivery)







# STRATEGIES TO IMPROVE MEDICATION ADHERENCE



# Effective Strategies for Improving Hypertension Medication Adherence

- ❑ Team-based care
- ❑ Pharmacist-led multicomponent interventions
- ❑ Education with behavioral support
- ❑ Pill counting
- ❑ Blister packaging
- ❑ Electronic monitoring
- ❑ Telecommunication systems for monitoring and counseling
- ❑ Single dose vs. multiple dose prescribed

Sources: Walsh J, McDonald K, Shojania K, et al. Quality improvement strategies for hypertension management: a systematic review. *Medical Care* 2006;44:646-57; Viswanathan M, Golin CE, Jones CD, Ashok M, Blalock SJ, Wines RC, et al. Interventions to improve adherence to self-administered medications for chronic diseases in the United States: a systematic review. *Ann Intern Med* 2012; 157(11):785-795.



# How to Overcome Challenges or Barriers by System Change

- ❑ **Introduce team-based care**
  - ❑ Collaborate with pharmacists and/or nurses
  - ❑ Educate patients on how to take medications
  - ❑ Monitor by pill box
- ❑ **Improve access and communication**
  - ❑ Offer patients the opportunity to contact the provider's office with any questions
  - ❑ Use telemedicine, particularly in rural areas
- ❑ **Use technologies and analytical services that facilitate measuring and improved adherence**

# Script Your Future

- ❑ National multiyear campaign to raise awareness about medication adherence
- ❑ This campaign brings together stakeholders in health care, business, and government in six regional target markets
- ❑ For health-care professionals, the campaign offers guidance on how to improve communication with patients
- ❑ For patients, the campaign offers practical tools to improve medication adherence

# US Surgeon General Regina Benjamin, MD

“Doctors, nurses, pharmacists and other health care professionals can help prevent many serious health complications by initiating conversations with their patients about the importance of taking medication as directed. This is especially important for people with chronic health conditions such as diabetes, asthma and high blood pressure, who may have a number of medicines to take each day.”

Source: <http://scriptyourfuture.org/wp-content/themes/cons/m/release.pdf>





## **Take-Home Messages for Providers**

- ❑ Display patience and empathy when interacting with patients**
- ❑ Be mindful of the number of medications prescribed and their frequency and dosages**
- ❑ Prescribe lower-cost medications and/or provide manufacturer coupons to help lower costs**
- ❑ Explain the consequences of non-adherence and suggest ways to improve adherence**
- ❑ Introduce team-based care to improve medication adherence**
- ❑ Identify roles and responsibilities in team-based care to deliver improved patient-centered health care**

# Tools

- ❑ **American Heart Association**
  - Medicine Management Tool
- ❑ **American College of Cardiology**
  - CardioSmart Med Reminder (mobile app)
- ❑ **National Heart, Lung, and Blood Institute, National Institutes of Health**
  - Tips to Help You Remember to Take Your Blood Pressure Drugs
- ❑ **American Society of Consultant Pharmacists Foundation**
  - Adult Meducation: Improving Medication Adherence in Older Adults
- ❑ **Script Your Future**
  - Wallet card for patients
  - Tools for providers

Sources: [URLs added to notes section of this slide](#)

# CDC Resources

## ❑ Educational Materials for Professionals. Division for Heart Disease and Stroke Prevention.

- Fact Sheets, Data and Statistics, Maps, Reports, Guidelines and Recommendations. Available at  
[http://www.cdc.gov/dhdsp/materials\\_for\\_professionals.htm](http://www.cdc.gov/dhdsp/materials_for_professionals.htm)

## ❑ Million Hearts: Prevention at Work.

- Achieve excellence in the "ABCS" (A=Aspirin for people at risk, B=Blood pressure control, C=Cholesterol management, S=Smoking cessation). Available at
  - <http://www.cdc.gov/24-7/prevention/MillionHearts/>
  - <http://millionhearts.hhs.gov/index.html>



## CDC Resources—(cont.)

### ❑ Team Up. Pressure Down.

- Providers may inform patients with high blood pressure to team up with their pharmacist to better understand their condition and any medications they are taking. Available at
- <http://www.cdc.gov/features/tupd/>
- <http://millionhearts.hhs.gov/resources/teamuppressuredown.html#Partners>

### ❑ A Program Guide for Public Health Partnering with Pharmacists in the Prevention and Control of Chronic Diseases. Division for Heart Disease and Stroke Prevention and Division of Diabetes Translation.

- This guide focuses on medication therapy management services provided by pharmacists to improve medication adherence. Available at [http://www.cdc.gov/dhdsp/programs/nhdsp\\_program/docs/Pharmacist\\_Guide.pdf](http://www.cdc.gov/dhdsp/programs/nhdsp_program/docs/Pharmacist_Guide.pdf)

# Health Literacy Resources

- ❑ **American Medical Association Health Literacy Video**
  - <http://www.ama-assn.org/ama/pub/about-ama/ama-foundation/our-programs/public-health/health-literacy-program/health-literacy-video.page>
  - [http://www.youtube.com/watch?v=cGtTZ\\_vxjyA](http://www.youtube.com/watch?v=cGtTZ_vxjyA)
- ❑ **AHRQ's Health Literacy Universal Precautions Toolkit**
  - <http://www.innovations.ahrq.gov/content.aspx?id=2684>
  - [http://www.rihlp.org/pubs/Complete\\_toolkit\\_224pgs.pdf](http://www.rihlp.org/pubs/Complete_toolkit_224pgs.pdf)
- ❑ **American College of Physician Foundation Health Literacy Programs and Resources on Medication Labeling**
  - <http://www.acpfoundation.org/health-literacy-programs/medication-labeling-2/>

# References

1. Casula M, Tragni E, Catapano AL. Adherence to lipid-lowering treatment: the patient perspective. *Patient Prefer Adherence* 2012; 6:805-814.
2. Choudhry NK, Avorn J, Glynn RJ, Antman EM, Schneeweiss S, Toscano M, et al. Full coverage for preventive medications after myocardial infarction. *N Engl J Med* 2011;365(22), 2088-2097.
3. Edmondson D, Horowitz CR, Goldfinger JZ, Fei K, Kronish IM. Concerns about medications mediate the association of posttraumatic stress disorder with adherence to medication in stroke survivors. *Br J Health Psychol* 2013 Jan 7; doi: 10.1111/bjhp.12022. [Epub ahead of print].
4. Elliott RA, Barber N, Horne R. Cost-effectiveness of adherence-enhancing interventions: a quality assessment of the evidence. *Ann Pharmacother* 2005; 39(3):508-515.
5. Fongwa MN, Evangelista LS, Hays RD, Martins DS, Elashoff D, Cowan MJ, et al. Adherence treatment factors in hypertensive African American women. *Vasc Health Risk Manag* 2008; 4(1):157-166.
6. Fretheim A, Aaserud M, Oxman AD. Rational prescribing in primary care (RaPP): economic evaluation of an intervention to improve professional practice. *PLoS Med* 2006; 3(6):e216.
7. George J, Shalansky SJ. Predictors of refill non-adherence in patients with heart failure. *Br J Clin Pharmacol* 2007; 63(4):488-493.

## References (cont.)

8. Gu Q, Burt VL, Dillon CF, Yoon S. Trends in antihypertensive medication use and blood pressure control among United States adults with hypertension: the National Health and Nutrition Examination Survey, 2001 to 2010. *Circulation* 2012; 126(17):2105-2114.
9. Ho PM, Bryson CL, Rumsfeld JS. Medication adherence: its importance in cardiovascular outcomes. *Circulation* 2009; 119(23):3028-3035.
10. Ito K, Shrank WH, Avorn J, Patrick AR, Brennan TA, Antman, EM et al. Comparative cost-effectiveness of interventions to improve medication adherence after myocardial infarction. *Health Serv Res* 2012; 47(6):2097-2117.
11. Kronish IM, Edmondson D, Goldfinger JZ, Fei K, Horowitz CR. Posttraumatic stress disorder and adherence to medications in survivors of strokes and transient ischemic attacks. *Stroke* 2012; 43(8):2192-2197.
12. Levine DA, Morgenstern LB, Langa KM, Piette JD, Rogers MA, Karve SJ. Recent trends in cost-related medication nonadherence among US stroke survivors. *Annals of Neurology* 2013 Feb 22; doi: 10.1002/ana.23823. [Epub ahead of print].
13. Lyles CR, Karter AJ, Young BA, Spigner C, Grembowski D, Schillinger D, et al. Patient-reported racial/ethnic healthcare provider discrimination and medication intensification in the Diabetes Study of Northern California (DISTANCE). *J Gen Intern Med* 2011; 26(10):1138-1144.
14. Morisky DE, Ang A, Krousel-Wood M, Ward HJ. Predictive validity of a medication adherence measure in an outpatient setting. *J Clin Hypertens (Greenwich)* 2008; 10(5):348-354.

## References (cont.)

15. Morisky DE, DiMatteo MR. Improving the measurement of self-reported medication nonadherence: response to authors. *J Clin Epidemiol* 2011; 64(3):255-257.
16. Osterberg L, Blaschke T. Adherence to medication. *N Engl J Med* 2005; 353(5):487-497.
17. Rasmussen JN, Chong A, Alter DA. Relationship between adherence to evidence-based pharmacotherapy and long-term mortality after acute myocardial infarction. *JAMA* 2007;297:177-186.
18. Ratanawongsa N, Karter AJ, Parker MM, Lyles CR, Heisler M, Moffet HH, et al. Communication and medication refill adherence: the Diabetes Study of Northern California. *Arch Intern Med* 2012 Dec 31;1-9.
19. Steiner JF, Ho PM, Beaty BL, Dickinson LM, Hanratty R, Zeng C, et al. Sociodemographic and clinical characteristics are not clinically useful predictors of refill adherence in patients with hypertension. *Circ Cardiovasc Qual Outcomes* 2009; 2(5):451-457.
20. Viswanathan M, Golin CE, Jones CD, Ashok M, Blalock SJ, Wines RC, et al. Interventions to improve adherence to self-administered medications for chronic diseases in the United States: a systematic review. *Ann Intern Med* 2012; 157(11):785-795.
21. Walsh J, McDonald K, Shojania K, et al. Quality improvement strategies for hypertension management: a systematic review. *Medical Care* 2006;44:646-57.
22. Yeaw J, Benner JS, Walt JG, Sian S, Smith DB. Comparing adherence and persistence across 6 chronic medication classes. *J Manag Care Pharm* 2009; 15(9), 728-740.





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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Division for Heart Disease and Stroke Prevention (DHDSP)

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP)

